Ethiopia schistosomiasis and soil-transmitted helminthes control programme: progress and prospects

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Ethiopia Schistosomiasis and Soil-Transmitted helminths control programme; Progress, and prospect

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Abstract

Soil-transmitted helminths and schistosomiasis are among seventeen WHO prioritized neglected tropical diseases that infect humans. These parasitic infections can be treated using single-dose, safe and often donated drugs.

Ethiopia successfully mapped the distribution of these infections nationwide. According to the mapping there are an estimated 38.3 million people living in schistosomiasis endemic areas, and 81 million in STH endemic areas. The Federal Ministry of Health successfully scaled up STH and Schistosomiasis intervention in endemic areas and treated over 19 million individuals in 2015.

The Ministry of Health has made tremendous effort to establish SCH/STH/NTD program in the health system which helped to map majority of the woredas and initiate nationwide intervention. The National control programme designed to achieve elimination for those diseases as a major public health problem by 2020 and aim to attain transmission break by 2025. The programme focuses on reaching those school-aged children who are not attending school, integration between NTD programmes, and further collaboration with the WASH sector.

Introduction

Neglected tropical diseases (NTDs) are a cluster of diseases which affect the poorest populations, often living in remote, rural areas, in urban slums or in conflict zone[1]. Schistosomiasis and Soil-transmitted helminthiasis are among the common NTDs. Schistosomiasis, also known as bilharzia, is caused by parasitic trematode worms found in fresh water. These parasitic worms are of the genus *Schistosoma*; the species *S. mansoni* (intestinal schistosomiasis) and *S. haematobium* (urogenital schistosomiasis) are the etiological agents for the main human infections in sub-Saharan Africa[2]. Likewise, Soil-transmitted helminthiasis, three of the most common intestinal worms (roundworm, whipworm, and hookworm). They all thrive in places where the soil is warm and humid and where sanitation is inadequate. Several of the NTDs, including schistosomiasis and STH infections, can be controlled easily through the periodic administration of preventive chemotherapy[2].

Global burden of schistosomiasis and STH

Schistosomiasis is endemic in 78 countries and territories in the tropics and subtropics[3]. *Schistosoma mansoni* is endemic in 54 countries and *S. haematobium* in 55[4]. Worldwide, almost 800 million individuals are at risk; about 200 million people are estimated to be infected. Of the 200 million people infected, 160 million live in Sub-Saharan Africa (SSA), where approximately 110 million are infected with *S. haematobium*. In its chronic stage, the disease leads to portal hypertension and organomegaly in 5%−8% of untreated infections, and it is also strongly associated with liver and bladder cancer[5,6].

Likewise soil-transmitted helminths (STHs) are among the most common and persistent parasitic infections worldwide[7,8]. According to the latest estimates, 819 million people are infected with roundworm (*Ascaris lumbricoides*), 465 million with whipworm (*Trichuris trichiura*), and 439 million with hookworm (*Necator americanus*, *Ancylostoma duodenale*)[7,8]. STHs are responsible for the impairment of physical and mental development in children, which ultimately slows educational advancement and economic development. The relationship between hookworm infection and anemia is well recognized, with numerous intervention trials showing that a direct effect of cure of infection is reduction in prevalence and intensity of iron deficiency anemia[1].

National context

Ethiopia conduct Schistosomiasis and STH nationwide mapping survey for all regions of the country in two rounds by Ethiopian Public Health Institute (EPHI). The intestinal form of schistosomiasis (caused by *Schistsoma mansoni)* is widely distributed while the uro-genital

form (caused by *S. haematobium*) is more restricted in distribution, primarily to foci in the rift valley region (see Figure 1). There are an estimated 38.3 million people living in schistosomiasis endemic areas, comprising 34.4 million pre-school children, 12.3 million school-aged children, and 21.6 million adults. In 2013, it was estimated that 35,775,100 cases of schistosomiasis occurred in Ethiopia[9]. Of the country's 833 districts, 374 are uninfected for both intestinal and urogenital schistosomiasis, 190 have low endemicity, 153 moderate endemicity, and 69 high endemicity.

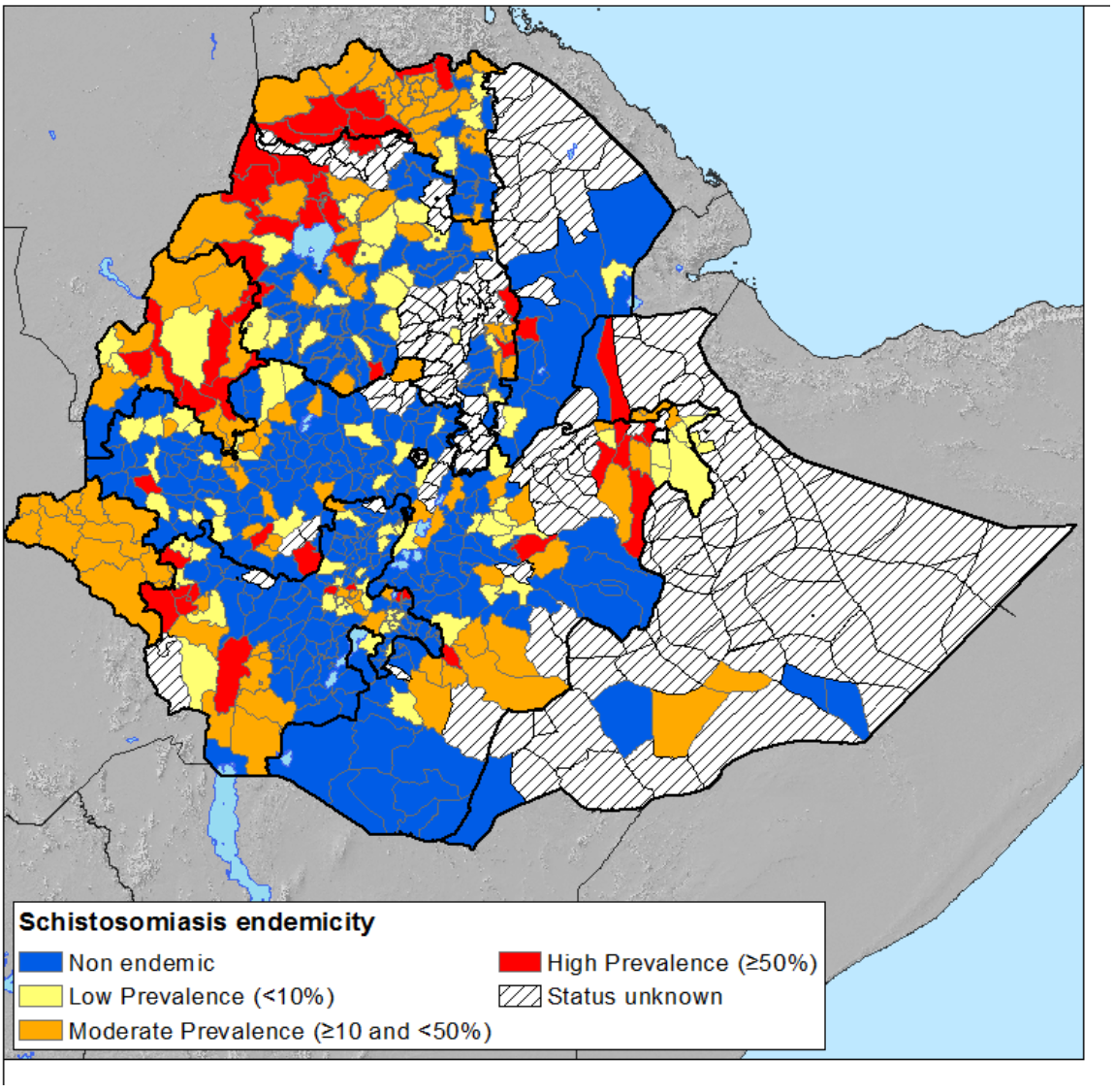

Figure 1. Distribution of schistosomiasis infection in Ethiopia categorized according to WHO guidelines

In Ethiopia, the number of people living in STH endemic areas is estimated at 81 million, which comprised of 9.1 million pre-school-aged children, 25.3 million school-aged children and 44.6 million adults. The number of individuals living in areas qualifying for STH-treatment is 56.7 million, comprised of 4.6 million pre-school children, 17.7 million school-

age children, and 31.3 million adults. The coordinated large-scale mapping of both schistosomiasis and STH demonstrated that 741 woredas are known to be endemic and 494 woredas require treatment against STH based on WHO guidelines. Furthermore, 279 woredas require treatment twice a year. Figure 2 exemplifies the widespread prevalence of STH across all regions of Ethiopia that have been mapped and analyzed thus far[9].

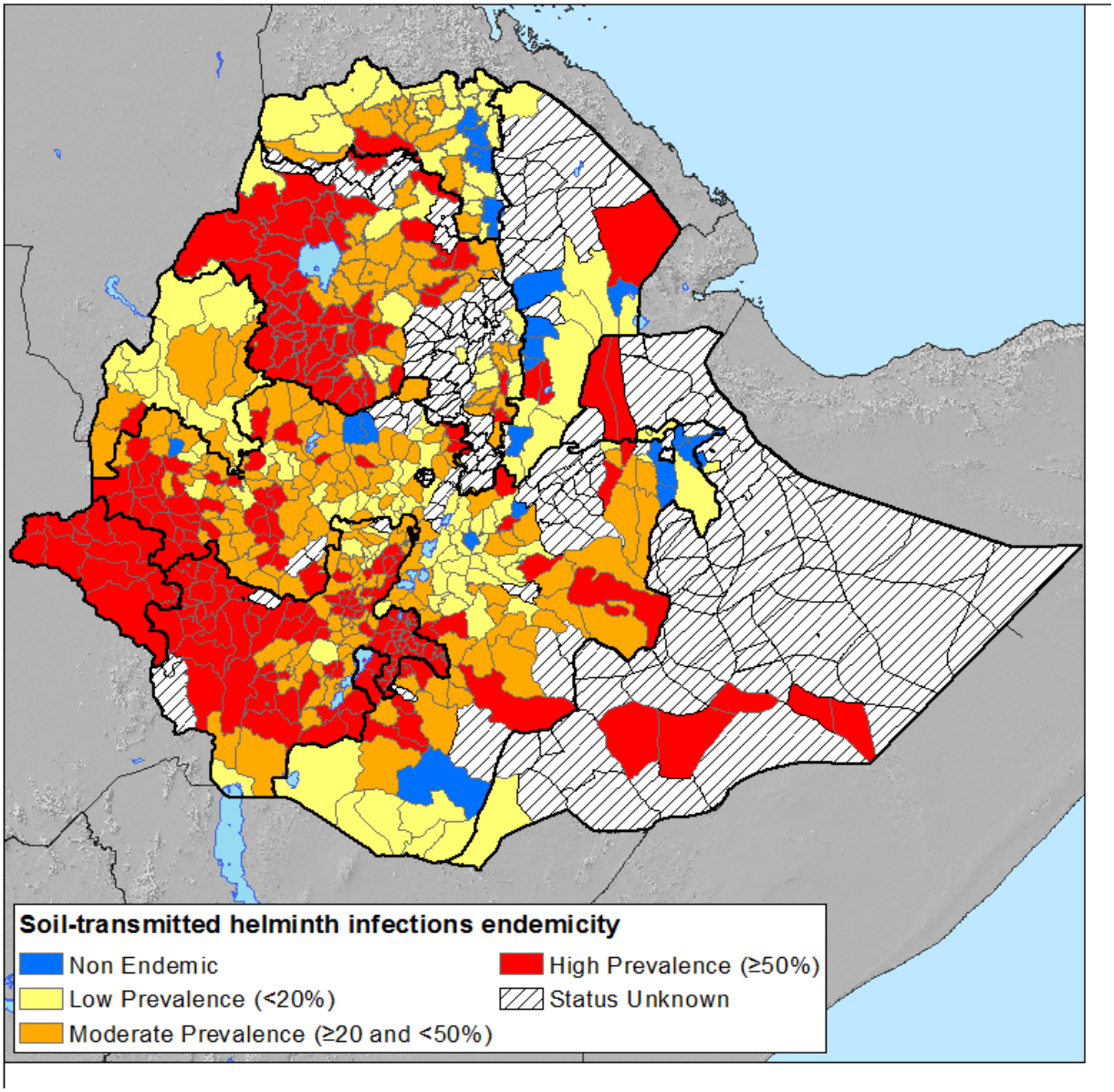

Figure 2. Distribution of STH infection in Ethiopia categorized according to WHO guidelines

Program implementation: Progress towards the goal

The control programme has long term and short term goals[10]. In the long term, the programme aims to eliminate STH-related morbidity in children as well as schistosomiasis – related morbidity by 2020. The aim is to reduce prevalence of heavy infection to less than 1% in all sentinel sites for both STHs and schistosomiasis. Creating integration between 5

PCT NTDs, increased co-ordination between MDA and WASH programmes as well as capacity building and operational research are also additional long term goals of the programme to ensure sustainability.

Some of the short-term programme goals are treating at least 75% of school age children, expanding treatment of adults to all adults in high SCH endemic districts, expanding treatment to all adolescent in SCH and STH endemic districts, decreasing intensity of infection by 65-90% from baseline for SCH at the end of the programme, reducing the heavy and moderate infection intensity to less than 1% for STH at the end of the programme[10].

Since the launch of the national programme in November 2015, over 19 million people have been treated for schistosomiasis and / or STH. Two rounds of treatment occurred in November 2015 and May 2016. Hence the program target to treat more than 25 million individuals in the second year of the program implementation. The treatment coverage for SCH and STH were 77 and 76.5%-80.5% respectively with 100% geographical coverage.

Targets and Actuals for November 2015/16 SCH / STH MDA: Year 1, Round 1					
Targeted SAC for SCH	SAC treated for SCH	Targeted SAC for STH	SAC treated for STH	Targeted No. of Woredas	Woredas treated
6.4 million	4.8 million	16.5 million	12.3 million	461	456
Targets and Actuals for November 2015/16 SCH / STH MDA: Year 1, Round 2					
2.5 Million	1.86 million	9.6 million	7.9 million	276	260

Prospect

Country ownership and leadership

The deworming program in Ethiopia is supported technically and financially by different international partners. It is essential to advocate and improve awareness on SCH/STH and other NTDs to ensure the program institutionalized in the health system. The fast-economic growth in Ethiopia would help to improve public-private partnership and domestic resource mobilization, strengthen institutional capacity and use of HEWs and HDAs.

Taking advantage of Integration with other NTDs

Based on the national mapping result from 2014 and 2015 there are 188 OV endemic, LF endemic 70, Co –endemic OV-LF 46, SCH—346, STH 476, SCH 346, 229 Co-endemic STH/SCH districts in Ethiopia. The World health organization (WHO) emphasize harmonization of different largescale mass drug administration in different platforms[2]. The national program takes the advantage of the co-endemicity of Schistosomisis and STH in most districts of the country and provide Praziqantel and Mebendazole/Albendazole in a school platform. In addition, the STH endemic districts further benefited from the LF program and in these districts MDA for STH conducted after six month of LF MDA.

Apart from that the national program piloting the integration of PC NTDs (schistosomiasis, soil-transmitted helminths, Lymphatic filarisis, trachoma and onchocerciasis) mass drug administration at district level in different time interval. The advantages of Integration are; integrated training, drug distribution to kebeles, community/schools high participation, strong mobilization, technical staff involvement and resource mobilization are believed to be integrated. In addition, helps in being cost-effective and helpful to treat same population for different diseases with different drugs at a week interval. The lesson from this pilot project will be scaled up to support the national NTD programs. This initiative improves the efficiency and ensure sustainability of NTDs in the health system.

Coordination and partnership

The Federal Ministry of Education (FMOE), with support from a variety of NGOs and multilateral partners has launched a comprehensive School Health and Nutrition (SHN) strategy in March 2016. This strategy supports deworming among other school-based health activities. The Master Plan sets out clearly its strategic agenda which is the attainment of an NTD-free Ethiopia through the concerted efforts of the Government of Ethiopia in a strengthened partnership with national, regional and international development partners and

the meaningful participation of the community. The governance of deworming program is set to involve all partners at different level which includes task force, steering committee, and technical working group. The WHO highlighted a need for “complementary interventions”: in addition to chemotherapy, it is recommended to implement vector control and improve WASH and veterinary health[2]. At this stage, the national program starts to harmonize the WaSH implementation with that of NTDs. Several diseases, such as schistosomiasis, trachoma and STH are transmitted as a result of poor water, sanitation and hygiene.

It is mandatory to ensure water and sanitation and good hygiene practices to avoid re-infection. Although WASH and NTD sectors work in the same communities, most of the time the two sectors work in parallel. This is partly due to difference in focus. The WASH sector in general focuses of reducing certain type of morbidities such as diarrheal disease and improve livelihood, while the NTD sector focuses on MDA for treating cases with less focus for prevention of these diseases. These brought about missed opportunities for collaboration of these two sectors. Recently NTD-WASH partnership has been established. This partnership will help to design and identify ways to integrate NTD and WASH effectively. It will also support the initiative to be scaled up nationally.

Likewise, eliminating parasite vectors such as molluscs can be integrated into existing disease control programs. Although such interventions are expensive to implement, they carry significant cost-benefits in the long run. However, their success depends on sufficient funding, integrating the different skills across sectors, successfully coordinating different interventions, as well as reducing damage to the environment when insecticides or molluscicides are used.

Monitoring and evaluation

The national SCH/STH program embrace different monitoring and evaluation measures to improve the quality of the program delivery.

Process monitoring; conducted through the implementation of Independent Monitoring surveys. Independent Monitoring aims to provide an objective, non-biased evaluation and measurement of the program’s inputs and outputs to monitor the program’s quality and success of its processes. In year 1, two rounds of independent monitoring were conducted to measure the:

- Quality of the training cascade (zonal and woreda-level trainings)

- Extent and reach of mobilization and sensitization activities prior to the de-worming campaign at the kebele-level
- Assessment of the woreda drug supply management and storage facilities
- Deworming day implementation in schools, including reporting and SAE management.
- Knowledge and experiences of treatment recipients and knowledge, attitudes, and practices (KAP) of key participants to the program.

Impact monitoring: In order to monitor the impact of the programme on infection levels, a plan was developed to establish a cohort of sentinel sites to be followed annually. A total of 180 sentinel sites were established nationally. These would be powered sufficiently to provide a representative picture of changes in infection patterns at both the national and the regional level. Of these 175 (97.2%) were surveyed successfully at baseline (prior to treatment) across all 11 regional states. A full cohort of baseline data has been collected across three phases (aligned with the MDA campaigns).

Performance monitoring: Coverage validation surveys: One of the key elements of performance monitoring is through the use of coverage validation surveys, as a means to provide an independent verification of the level of treatment coverage. The first coverage validation survey was conducted in July 2015 to validate the April 2015 pilot treatment round. The survey was conducted in eight districts drawn from the three largest regional states: Amhara, Oromia and SNNPR.

The results of this survey are covered in detail in the coverage validation report. In summary, the overall finding was satisfactory in terms of coverage with overall average of 85.3% for MEB coverage and 84.9% of PZQ. The school attendance of respondents from the survey showed that there is a pool of non-enrolled school age children that should be addressed through increased community sensitization to increase the coverage among them.

Challenges

Of the country's 839 woredas 786 have been mapped and intervention started to control STH but there are still about 53 woredas that require baseline assessment. Effective community mobilization and sensitization remain a challenge. These require reviewing all kind of channels and appropriate message to reach the target population. The control of STH depends on treating school age children and in order to break the transmission adolescents and adults should be addressed. This depends on the donation of drug which is

limited only to school age children. According to the ministry of Education school enrolment rate is estimated to be more than 85%. However, there are reports that many of them leave school after registration. In deworming it is challenging to bring non-enrolled children for treatment which decreases the overall national target. It is believed that deworming decrease worm load and prevalence significantly in the weeks after treatment but sustaining low worm load and low prevalence is difficult due to inadequate access water and sanitation facilities. Furthermore, the programmes need to make available highly accurate diagnostic assays as they advance towards low intensity of infections in endemic areas and considering elimination. Therefore; making available highly sensitive diagnostic tools for the Ethiopian programme might soon be a challenge especially when moving towards elimination as it requires resources.

Conclusion

The Ministry of health has made tremendous effort to establish STH/NTD program in the health system which helped to map majority of the woredas and initiate nationwide intervention. Transmission break will depend on expansion of treatment to adolescents, adults and vulnerable groups, a greater focus on reaching non-attending school-aged children and integration between NTD programmes, and further collaboration with the WASH.

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